

New York State Comprehensive Emergency Management Plan

Drought Management Coordination Annex



**Disaster Preparedness
Commission**

**Prepared by the New York State
Disaster Preparedness Commission**

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Drought Management Task Force Members

NYS Office of Emergency Management

NYS Department of Environmental Conservation

NYS Department of Health

NYS Department of Agriculture and Markets

NYS Thruway Authority

NYS Canal Corporation

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Acronyms

DAM	Department of Agriculture and Markets
CANALS	New York State Canal Corporation
CEMP	Comprehensive Emergency Management Plan
DE	Diatomaceous Earth
DEC	Department of Environmental Conservation
DFP	Drought Forecasting Plan
DOH	Department of Health
DMTF	Drought Management Task Force
DOT	Department of Transportation
DPC	Disaster Preparedness Commission
DRBC	Delaware River Basin Commission
FSA	Farm Service Agency
HRBRRD	Hudson River Black River Regulating District
IMT	Incident Management Team
MACC	Multi-Agency Coordination Center
NIMS-ICS	National Incident Management System Incident Command System
PDI	Palmer Drought Index
PSC	Public Service Commission
SDI	State Drought Index
State EOC	State Emergency Operation Center
State OEM	State Office of Emergency Management
SRBC	Susquehanna River Basin Commission
TWY	New York State Thruway Authority
OFPC	State Office of Fire Prevention and Control
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WARN	Water/Wastewater Agency Response Network

New York State Comprehensive Emergency Management Plan Drought Management Coordination Annex

Section I: Introduction

New York State's communities normally have access to abundant water supplies to provide for agricultural, recreational, industrial, medical, residential and, most importantly, drinking needs. Historically, droughts have been relatively infrequent during the past decades of record keeping. The 1960s, however, witnessed a historic drought which lasted until 1967. The worst period was from 1964 through 1965. This drought severely impacted regional agriculture, water quality, forest health and human health. It also resulted in widespread forest fires, crop failures, fish kills, water shortages, harmful algal blooms, and heat related deaths. As recently as 2016, a D-2 (Severe) drought occurred affecting the Western NY, Finger Lakes, and Southern Tier Regions of New York State. At this same time, approximately 90% of the State was abnormally dry or in a moderate drought.

In recent history, beginning in 1980 and continuing to present day, the state has experienced an increase in the occurrence of periods of prolonged dry spells that had impacts but were not severe enough to classify as droughts. This has resulted in repetitive drought awareness as the agricultural communities and homeowners struggle to cope. In several instances, municipal water supplies have been threatened as well. This Annex outlines a strategy for improved preparedness in New York State (NYS) with the threat of drought.

In 2021, Governor Hochul, by Executive Order No. 6: Continuation, and Expiration of Prior Executive Orders, ordered the continuation of Executive Order No. 116 that was originally issued on January 7, 2002. The Executive Order called for the reconstitution of the State Drought Management Task Force (DMTF) to coordinate State drought response activities and to assist localities. The Task Force's responsibilities are set forth in the Executive Order which can be found in Appendix A. The individual agency response actions to be implemented are in Table 3.

A. Purpose

The State Comprehensive Emergency Management Plan (State CEMP) has been structured into three distinct, but interconnected volumes. These are:

- Volume 1: All-Hazard Mitigation Plan
- Volume 2: Response and Short-Term Recovery
- Volume 3: Long-Term Recovery Plan

The purpose of the State CEMP is to identify the State's overarching policies, authorities and response organizational structure that will be implemented in an emergency or disaster situation that warrants a state response. In addition, the State CEMP identifies the lines of coordination and the centralized coordination of resources that will be utilized in directing the State's resources and capabilities in responding to and recovering from a disaster. Further, the State CEMP serves as the foundational framework for the State's response levels and serves as the operational basis of which other functional and hazard-specific annexes will build upon.

This Annex for Drought Management Coordination identifies State and local actions to be undertaken for both drought preparedness and response. Through coordinated preparedness and response efforts, the impact of drought conditions on communities and commerce can be reduced. This Annex provides the framework for the implementation of strategies and actions that will reduce the vulnerability to drought conditions by taking pre-incident mitigation actions or reduce the untoward impacts of a drought by coordinating relief efforts.

B. Scope

The Drought Management Coordination Annex will serve as a hazard-specific annex to the State CEMP. As such, this Annex:

1. Will apply to incidents that require the State to implement response activities for a pending or actual drought, or incidents that impact the availability of water.
2. Applies to incidents that require a limited or full activation of the State Emergency Operation Center (State EOC).
3. This Annex applies to all State agencies and authorities that may be directed to respond to such an event and builds upon the process and structure of the State CEMP by addressing unique policies, situations, operating concepts, and responsibilities. Response operations to this type of event will encompass the efforts identified in this annex and utilize existing capabilities of other functional and hazard-specific annexes to the State CEMP.
4. The Drought Management Coordination Annex is a strategic level management plan that outlines the basic concepts required to manage and coordinate State agencies providing response and short-term recovery assistance to localities.
5. Disaster response begins and ends at the local level. State level support begins and ends based on statutory requirements and/or the needs of the requesting community.

C. Situation

Disaster response and short-term recovery activities generally begin and end at the local government level. Local emergency response agencies may be fully involved with operational issues that are critical for responding to incidents that fall under the purview of this Annex. Further, the parameters and complexity of the incident may, in many cases, exceed the response capabilities of local government. The local government is responsible for carrying out the initial response and short-term recovery activities and services and will use all available local resources in doing so.

Most county and local governments have developed comprehensive emergency management plans in accordance with State Executive Law, Article 2-B (Article 2-B). Such plans coordinate the collective response of that local government, within its borders, and provide for a mechanism to use all existing resources.

At such time that a local government can no longer provide the services and assets required for protecting the population from further injury or devastation resulting from the disaster situation, the State CEMP may be activated. State response activities in support of local government

should provide the necessary support with State assets or the coordination of local assets from unaffected areas. Interagency coordination, information sharing, and cooperation at all levels of government will be the key to an effective and efficient response to bring the event to a conclusion.

D. Planning Assumptions

The Drought Management Coordination Annex is based on the following assumptions:

1. State assistance will serve as a supplement to local actions and will be made only after local resources are exhausted.
2. Resources allocated under this Annex will be those items not available at the local level, because they were never available to the locality, have been exhausted in response to the emergency, or are not accessible within the time frame of the applicable emergency. These may include contractual services.
3. One or more local entities may have declared a local State of Emergency in response to a disaster and the State has been called upon to assist.
4. The State in its response may utilize a variety of National Incident Management System Incident Command System (NIMS-ICS) components, including a Multi-Agency Coordination Center (MACC) and the State's Incident Management Team (IMT).
5. The State, after fully exhausting its resources, may request Federal resource support in responding to and recovering from the emergency or disaster.
6. In the event of a major response and recovery operation, the State may be required to assist local governments by providing distribution facilities and personnel to manage those facilities. Communications assets may also be needed to support facility operations.

E. Legal Authorities

The authority to develop this Annex and implement specific response actions to effectively respond can be found in several State Laws and Executive Orders, including the following:

1. State Authorities
 - NYS Executive Order #6
 - NYS Executive Law, Article 2-B
 - NYS Public Health Law; Multiple articles and sections
 - NYS Code Rules and Regulations; Title 10, multiple citations

F. Concept of Operations

1. Incidents Originating Locally

- a. An incident requiring the activation of the State CEMP may begin locally and escalate to the State level.
- b. State assistance will be supplemental to local emergency efforts.

2. State Response

- a. Depending on the nature and scope of the incident, State agency involvement may begin coincidentally with the start of an incident (e.g., a hurricane).
- b. Local agencies will be used according to standard protocols and statutory requirements.

3. Integration of Federal Assets and Resources

- a. Federal resources will be supplemental to State efforts and may include the assimilation of various federal response components.

G. Plan Maintenance and Updating

The State Office of Emergency Management (State OEM) Planning Section has the responsibility for the development, review, and maintenance of all multi-agency response plans under the State CEMP. As required under Article 2-B, each document shall undergo an annual review and update on or before February 15th of each year and be posted online (if applicable) no later than March 31st of each year.

During the annual review by the Planning Section, this plan is examined for both content and format. For updates that do not impact operational mechanisms or processes, the appropriate edits are initiated within the Planning Section and do not warrant external involvement. Plan updates will also be conducted based upon experiences and lessons learned from exercises or real-world events, or through administrative changes in government. Planning Section updates and/or edits affecting operational capabilities, responsibilities, or otherwise impacting operations will engage stakeholders in a variety of ways, such as verbally, by document review, meetings, webinars, or any combination thereof. Final drafts will be socialized to all appropriate agencies/personnel upon completion.

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Section II: Preparedness

Drought Preparedness includes two activities. The first is the monitoring and evaluation of climatological and hydrological conditions in NYS for early awareness of a potential drought. The second is the implementation of short- and long-term options for programs and projects to minimize drought impacts. Drought Preparedness requires an active coordinated effort by public and private entities at all levels - local, State, and Federal.

A. Drought Regions

Eight drought regions have been established based on climatological, physiographic, and other factors. See Table 1 on page 12.

This Drought Management Coordination Annex recognizes a Sub-Region of Drought Region II as Drought Sub-Region II-A. Drought Sub-Region II-A is comprised of New York City and the upstate areas served by public drinking water systems that draw water from the New York City managed drinking water supply system. The areas served by public water systems using New York City's supply include parts of Ulster, Orange, Putnam, and Westchester counties. The public drinking water systems that comprise Drought Sub-Region II-A are listed in Appendix E. This drought Sub-Region was defined so that the drinking water supply common to these public water systems can be evaluated and managed in a coordinated manner during periods of drought.

Public drinking water systems that comprise Sub-Region II-A should monitor the status of drought declarations made by New York City and in times of drought should implement water conservation measures consistent with New York City's "Drought Management and Contingency Plan". Appendix D has a summary of this plan. The full plan is on file with the State OEM Planning Section.

B. Drought Indices

The Drought Forecasting Plan (Appendix B) developed by the Department of Environmental Conservation (DEC) relies on calculated drought indices to support proper identification of the State's drought status.

A calculated State Drought Index has been developed and is used in determining drought status on a regional basis. Four major hydrologic elements are considered in the calculation of the State Drought Index. They are:

- precipitation
- reservoir and lake storage
- stream flow
- groundwater levels

A second calculated indicator, The Palmer Index is also evaluated on a regional basis. The Palmer Index is primarily a measure of soil moisture deficiency.

Additional detail on the calculation and use of these indices for determining drought status is included in the Drought Forecasting Plan (Appendix B).

C. Drought Stages

Drought stage is then determined by appraisal of both indices. Drought stage is determined for each drought region. "Normal conditions" and four different drought stages have been established:

Stage 1: Drought Watch - This first stage of a developing drought event is declared by the DEC based on the Drought Forecasting Plan (Appendix B). It is intended to give advanced notice of a developing drought. At this stage, the general public is urged to conserve water. Public water purveyors and industries are urged to update and begin to implement individual drought contingency plans.

Stage 2: Drought Warning - This second stage also is declared by DEC based on the Drought Forecasting Plan. It is a notice of impending and imminent severe drought conditions. A warning declaration includes stepping up public awareness and increasing voluntary conservation. Public water supply purveyors and industries are urged to continue to implement local drought contingency plans. Federal, State, and local water resources agencies are notified to prepare for emergency response measures.

Stage 3: Drought Emergency - This third stage is declared by the New York State Disaster Preparedness Commission (DPC), based on this plan and upon recommendation of the DMTF. It is a notice of existing severe and persistent drought conditions. An emergency declaration is a notice for local water resources agencies to mandate conservation and implement other emergency response measures. A continuing and worsening drought emergency may result in the Governor declaring a drought disaster. It is a notice of the most severe and persistent drought conditions. At this stage a significant proportion of communities in the impacted area likely are unable to respond adequately.

Stage 4: Drought Disaster - This fourth and most severe stage of persistent drought conditions is declared by the Governor when a significant proportion of communities in the impacted area are unable to address local needs adequately. In response, an Executive Declaration and Order by the Governor may be necessary to marshal State personnel and resources.

D. Preparedness Options

The DMTF has determined that ensuring public health is the highest priority for drought preparedness. As with any disaster preparedness effort, public education is one of the most effective manners to mitigate a portion of the potential impacts of occurrence. Therefore, regular public education, focusing upon home preparedness (e.g., stored water and practical conservation measures) with increased public service announcements and target marketing during times of increased threat/concern should be a priority.

Recognizing the vulnerability of many smaller and mid-sized communities, it is realized that alternative water supply systems would be needed for an extended period, potentially in dozens of communities depending upon the scope of the event. This broad ranging local need will quickly exceed local capabilities and severely strain, if not actually exceed, State resources to provide assistance. A public/private partnership will better prepare NYS to address water shortages and better protect public health. This partnership should include identification of water suppliers, haulers, well drillers, water testers, and other similar private experts and providers who could be called upon to serve the communities during a disaster. This partnership includes development of pre-incident relationships, whether formalized via businesses' achieving a State-contract status to allow local government quicker access during emergency, or merely as an informal relationship which would encourage information sharing before and during any water emergency.

Other recommended actions include accelerating the completion of local drought contingency plans, including encouraging the adoption of local codes authorizing local governments to impose water conservation measures in time of drought. However, these accomplishments will not resolve all drought problems. Areas that face critical water shortages under prolonged drought conditions should implement permanent water conservation measures and pursue other alternatives including the development of additional water sources.

Drought Preparedness recommended actions are listed in Table 2. They are listed in general order of priority for statewide programs and options for investigations in other areas of the State.

New York State Comprehensive Emergency Management Plan

Drought Management Coordination Annex

Section III: Response

A. Overview

The State of New York considers drought contingency planning at the local level to be essential because local governments and suppliers of water have the primary responsibility for insuring the availability of adequate quantities of potable water. However, this Annex recognizes the need for coordinated State and local government drought actions. Therefore, it is prudent to pre-identify actions to be taken at each drought stage.

Organizationally, the DMTF coordinates and manages drought-related actions through the activities of the member agencies prior to the declaration of a drought emergency. In the event of a drought emergency declaration, the DPC through the State Coordinating Officer directs the emergency management efforts.

Actions to respond to the various stages of a drought situation, as reflected by the drought indices, are summarized in Table 3. These actions are categorized as either State government actions or actions taken at the local level by local government and/or local water suppliers.

The DMTF recommends implementation of these drought response activities, as appropriate for drought conditions. The actions have been determined to be feasible with available resources and will mitigate the impacts of drought to the extent practicable.

Local agencies and governments are encouraged to implement the drought response activities identified in Table 3. The member agencies of the DMTF will assist in the development and implementation of these efforts.

At the interstate level, drought response actions involving NYS are taken through the Delaware River Basin Commission (DRBC) and the Susquehanna River Basin Commission (SRBC).

During times of drought the DRBC coordinates the declarations and drought management responses of its member states - Delaware, New Jersey, New York, and Pennsylvania – in the Delaware River watershed and provides technical assistance. The Commission initiates mandated phased reductions in diversions and releases from New York City's Delaware water supply reservoirs during drought conditions. The Commission has authority to marshal releases from other reservoirs during drought emergency.

During times of drought, the SRBC coordinates the declarations and drought management responses of its member states - New York, Pennsylvania, and Maryland – in the Susquehanna River watershed and provides technical assistance. During drought emergencies, the Commission has authority to: (1) maintain stream flows by requiring consumptive water users to compensate for their consumptive use; and (2) direct increases or decreases of previously approved water uses to ensure that priority water needs are met.

B. Emergency Resources

Drought response may require the application of substantial State resources to assist local governments in combating the effects of drought. The State OEM emergency equipment stockpile is maintained for this purpose. However, even a relative short duration dry period can exhaust State resources such as tankers. The 2007 drought was not widespread or extended duration, yet it engaged all tanker resources. Appendix D is a listing of the State OEM emergency equipment stockpile resources. Every effort should be made to supplement State OEM's equipment stockpile.

Drinking water utilities in New York State initiated a statewide mutual aid system called WARN (Water/wastewater Agency Response Network). This mutual aid system is beginning to be adopted by water utilities and it is expected that wastewater utilities will follow suit. The WARN system will provide for additional emergency response resources to be available locally through a pre-defined mutual aid process. While not all utilities are likely to join this voluntary effort, increased participation will improve drought preparedness.

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Section IV: Recovery

A. Overview

Dependent on the nature of the event, the response to an emergency or disaster may be relatively short or could extend for some time. As the scope of the response begins to shift to a recovery process, the response structure that is in place will change. When this transition occurs, operational components, such as the State Incident Management Team, may be demobilized. As a result, the mechanisms of the recovery process will be transferred from the State EOC to the Joint Field Office.

The State CEMP outlines the disaster relief funding and programs that would be applicable for an incident of this type. Included are provisions for Public Assistance (PA) and Individual Assistance (IA), which would aid in supporting government response operations and provide some recovery assistance for individuals and their families, businesses and sectors identified in the preceding pages. The implementation of the recovery process is identified in Volume 2 of the State CEMP – *Response and Short-Term Recovery*.

As the recovery process begins, requests for State and Federal response resources will begin to diminish. As the response structure demobilizes, activated emergency facilities may, over a period of time, begin to demobilize.

**New York State Department of
Environmental Conservation**

Drought Regions

- I Long Island
- IIA NYC/Westchester
- II Catskills
- III Susquehanna
- IV Mohawk/Upper Hudson
- V Adirondack
- VI Great Lakes
- VII Finger Lakes
- VIII Southern Tier

**New York State
Drought Management Regions**

**TABLE 1:
NYS Drought Regions**

NYS DROUGHT REGIONS	COUNTIES
I - Long Island	Nassau, Suffolk
II - Catskills/Lower Hudson Valley	Delaware, Dutchess, Greene, Orange, Putnam, Rockland, Schoharie, Sullivan, Ulster
IIA - Drought Sub-Region for New York City and Dependent Water Systems	<p>NYC Drought Sub-Region IIA is comprised of New York City and Westchester County. Additional upstate communities that draw water from the New York City water supply system are also subject to its Drought Management Plan and Rules.</p> <p>(See Appendices D and E.)</p>
III - Susquehanna	Broome, Chenango, Cortland, Madison, Otsego, Tioga
IV - Mohawk/Upper Hudson	Albany, Columbia, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Herkimer (southern), Oneida, Washington
V - Adirondack	Clinton, Essex, Franklin, Hamilton, Herkimer (northern), Lewis, St. Lawrence, Warren
VI - Great Lakes	Chautauqua, Erie, Genesee, Jefferson, Monroe, Niagara, Cayuga (northern), Orleans, Oswego, Wayne
VII - Finger Lakes	Livingston, Onondaga, Ontario, Schuyler, Seneca, Cayuga (southern), Tompkins, Wyoming, Yates
VIII - Southern Tier	Allegany, Cattaraugus, Chemung, Steuben

**TABLE 2:
Drought Preparedness Recommendations**

RECOMMENDED ACTION	PRINCIPAL AGENCIES	COMMENTS
A. Statewide Programs		
1. Encourage water conservation programs statewide and the adoption of local codes authorizing the imposition of water conservation measures	All Agencies (State, Local Governments and Water Suppliers)	Program includes public information and education and water supply management efforts. Local governments should adopt codes authorizing them to impose and enforce water conservation measures during times of drought and other water supply emergencies.
2. Continue to replenish and expand emergency equipment stockpile	State OEM, DOH, DAM	Need to update mobile water treatment, pumping and hauling capabilities.
3. Complete and/or upgrade water system drought contingency plans	Water Suppliers, Local Governments, DOH	DOH encourages plan development and provides planning guidance.
4. Cooperate in development of local and regional drought plans and mutual aid agreements.	DEC, DOH	
5. Provide technical assistance	All Agencies	
6. Manage water resources of the State to support emergency drought efforts	DEC, HRBRRD, DRBC, SRBC, Canals, NYPA, USACE, Water Suppliers	
B. Options for Investigations		
1. Investigate and promote water supply interconnections	Water Suppliers, DOH, DEC	Water suppliers should include this in capital project planning. DEC should consider promoting this under the water supply program. DOH should encourage this by promoting it and helping to fund interconnections under the drinking water State revolving fund.
2. Investigate groundwater supplies for emergency use	Water Suppliers, DAM, DEC, USGS	
3. Evaluate NYS water resources for emergency use	Water Suppliers, DEC, Canals, HRBRRD, DRBC, SRBC, USACE, DOH	
4. Implement and encourage water metering programs	Water Suppliers, DOH, DEC, PSC	Water Suppliers should implement water metering programs to more efficiently manage water distribution and drought conditions. State agencies should assist and encourage water suppliers to implement metering programs.

TABLE 3:
Summary of Response Actions:
State, Local, and Water Suppliers

NORMAL CONDITIONS	
DMTF	<ol style="list-style-type: none"> 1. Monitor and evaluate drought status. 2. Plan for "worst case" situations. 3. Periodically review the State Drought Management Coordination Annex and recommend and approve updates to such Annex as needed. 4. Coordinate drought-related activities in accordance with such Annex. 5. Maintain drought planning process. 6. Assist in review and development of local drought contingency plans in cooperation with local, State, and Federal programs. 7. Meet as needed to ensure State response to drought conditions.
State OEM	<ol style="list-style-type: none"> 1. Prepare and keep updated the State Drought Management Coordination Annex. 2. Maintain and make available the emergency equipment stockpile for use during emergency situations.
DEC	<ol style="list-style-type: none"> 1. Prepare and keep updated the State Drought Forecasting Plan. 2. Determine the current drought status for each region of the State.
DOH	<ol style="list-style-type: none"> 1. Provide guidance for developing water supply emergency plans to address and respond to drought conditions. 2. Obtain and review water supply emergency plans from community water systems to ensure that community water systems have identified appropriate drought responses.
Individual DMTF Agencies	<ol style="list-style-type: none"> 1. Encourage the development of local drought contingency plans. 2. Review and provide technical assistance in the development of local drought contingency plans. 3. Prepare and maintain information for use in public information campaigns. 4. Review and provide technical assistance in the development of additional water supply sources by water suppliers and local agencies
Local Agencies and Water Suppliers	<ol style="list-style-type: none"> 1. Develop and keep current local drought contingency plans. 2. Maintain drought resource and response capability. 3. Make necessary improvements to water systems. 4. Initiate leak detection and repair programs. 5. Plan for worst case situations. 6. Local governments enact legislation to provide for local drought response and enforcement authority.
DPC	<ol style="list-style-type: none"> 1. Support development of State and local drought contingency plans.

STAGE 1: DROUGHT WATCH
Continue all actions initiated under “Normal”, in addition the following actions will be taken:
DMTF <ol style="list-style-type: none"> 1. Monitor and evaluate drought status. 2. Meet as needed to ensure adequate State response to drought conditions. 3. Assess capability of governmental programs that apply to drought preparedness and response.
State OEM <ol style="list-style-type: none"> 1. Chair the DMTF, schedule meetings as necessary. 2. Prepare drought updates and generally disseminate drought related information. 3. As directed by the DMTF, coordinate drought related activities with appropriate local, State, and Federal agencies. 4. Advise and respond to drought affected communities and coordinate implementation of recommended water-use restrictions. 5. Maintain and make available stockpiles of pipe, pumps, and other water treatment and transport equipment for use during emergency situations.
DEC <ol style="list-style-type: none"> 1. Monitor and evaluate technical data regarding meteorological and hydrological conditions from available sources. 2. Determine the current drought status for each region of the State. 3. Declare a change in status as warranted. 4. Coordinate State drought declarations with communities and interstate commissions. 5. Ensure the protection of aquatic habitats. 6. Prepare drought updates and generally disseminate drought related information.
DOH <ol style="list-style-type: none"> 1. Review and approve requests for use of equipment from the State OEM stockpile. 2. Monitor drinking water supplies and monitor surface water and groundwater supply storage levels once a month. 3. Report water supply levels to DEC for incorporation into the calculation of drought indices. 4. Obtain and review drought emergency plans from community water systems within drought affected areas and ensure that community water systems act in accordance with such plans.
DAM <ol style="list-style-type: none"> 1. Ensure that agriculture receives appropriate access to non-potable water supplies. 2. Coordinate and consult with Soil and Water Conservation Districts in assessing local groundwater conditions. 3. Coordinate crop failure data with assistance from USDA FSA. 4. In coordination with State OEM, at the request of a county emergency manager, authorize use of stockpile equipment to the extent of its availability, to assist county efforts in delivering potable or non-potable water for critical livestock needs. 5. Provide DEC and the DMTF with agricultural drought information.
Individual DMTF Agencies <ol style="list-style-type: none"> 1. Provide technical assistance to localities. 2. Prepare drought updates for DMTF. 3. Intensify monitoring and appraisal of drought status. 4. Advise the Task Force and provide technical information.

Local Agencies and Water Suppliers

1. Review and update local drought plans.
2. Promote voluntary water conservation measures.
3. Monitor supply and demand conditions of local water systems, especially systems known to be "drought susceptible".
4. Check status of leak control programs. Expand efforts where appropriate.

STAGE 2: DROUGHT WARNING

Continue all actions initiated under "Drought Watch", in addition the following actions will be taken:

DMTF

1. Convene monthly to assess Statewide drought conditions and implement State drought actions.
2. Accelerate drought management efforts as the situation worsens.
3. Continue to monitor and evaluate drought actions.
4. Alert the Disaster Preparedness Commission (DPC) as to status of situation.
5. Initiate coordination with Federal agencies and other States to alleviate potential drought impacts.
6. Recommend declarations of drought emergency to the DPC as appropriate (must be a unanimous vote of the DMTF).

State OEM

1. Chair the DMTF and schedule at least one meeting a month during a Drought Warning.
2. Evaluate readiness of emergency equipment stockpile and request replenishment as needed.

DEC

1. Advise the DMTF and provide technical support.
2. Coordinate State drought declarations with communities and interstate commissions.

DOH

1. Request water suppliers in Stage 2 (Drought Warning) areas to implement water conservation measures.
2. Intensify monitoring of drinking water supplies.
3. Assist State OEM in evaluating readiness of water supply equipment in the emergency equipment stockpile.

CANALS

1. Report to the DMTF regarding the availability of canals and reservoirs to provide water to drought affected regions of the State.

TWY

1. Coordinate with State OEM on the availability of TWY equipment for pumping and transporting water.

Individual DMTF Agencies

1. Promote public information and technical assistance programs.
2. Review and update local and State drought plans.

Local Agencies and Water Suppliers

1. Make supply projections for predicting future drought effects.
2. Expand and enforce leakage detection and repair programs.
3. Intensify voluntary water conservation efforts. Local agencies may also initiate mandatory restrictions as provided for under local codes or drought plans.
4. Make provisions for utilization of emergency sources of supply.

DPC

1. Urge completion of drought contingency plans.

STAGE 3: DROUGHT EMERGENCY
Continue all actions initiated under "Drought Watch & Warning", in addition the following actions will be taken:
<p>DMTF</p> <ol style="list-style-type: none"> 1. Meet twice per month. 2. Review drought preparedness plans for deficiencies. 3. Review options for water from NYS Canal System reservoirs and/or Hudson River-Black River Regulating District. 4. Recommend needs for legislation, funds or other actions to improve State drought response capabilities. 5. Review Regional/State drought implications. 6. Review and prepare to initiate actions to meet "worse case" situation. 7. Initiate appropriate governmental programs to mitigate drought impacts and provide public information regarding these programs. 8. Establish priorities for use of equipment and technical assistance. 9. Advise DPC of local and State emergency actions. 10. Make recommendations to the DPC.
<p>State OEM</p> <ol style="list-style-type: none"> 1. Coordinate stockpile use. Provide limited resources on a priority basis.
<p>DEC</p> <ol style="list-style-type: none"> 1. Issue emergency permits to water suppliers to withdraw water from streams and rivers under certain restrictions. 2. Intensify monitoring and evaluation of drought status.
<p>DOH</p> <ol style="list-style-type: none"> 1. Request suppliers, by letter, to adopt further measures to conserve water and to take advance actions that are necessary to utilize alternative water sources. 2. Assist State OEM in their prioritization for use of emergency water supply equipment.
<p>OFPC</p> <ol style="list-style-type: none"> 1. Distribute Fire Service Guide "Suggested Fire Department Operations for Drought Emergencies."
<p>All State Agencies</p> <ol style="list-style-type: none"> 1. Provide equipment and technical assistance to localities. 2. Implement water conservation in State Office Buildings. 3. Utilize regulatory and emergency powers as appropriate.

Local Agencies and Water Suppliers

1. Re-evaluate and use as needed, alternate water resources.
2. Restrict water use in stages, banning non-essential use first and then reducing water for essential use.
3. Implement local public awareness and water conservation campaign.
4. Use emergency equipment and tap emergency sources of water.
5. Request technical assistance and equipment from the State, if necessary.
6. Initiate penalties for violations of water use restrictions.
7. Intensify leak detection and repair programs.
8. Take preparatory actions that are necessary to utilize alternative water sources.

DPC

1. Consider DMTF recommendations.
2. Consider need for a State declaration.
3. Appoint liaison officer to DMTF if a declaration is made.
4. Request emergency assistance from the Federal Emergency Management Agency.
5. Direct State agency response.
6. Establish task force to develop phased emergency disaster plans where needed.

STAGE 4: DROUGHT DISASTER

Continue all actions initiated previously, in addition the following actions will be taken:

DMTF

1. Respond to directives to implement DPC actions.

All State Agencies

1. Take actions as directed by the Governor and DPC.

Local Agencies and Water Suppliers

1. Initiate further restrictions on water use, including reducing flows to non-essential users.
2. Undertake all possible local disaster relief efforts.
3. Request State and Federal disaster declarations.
4. Enact emergency legislation and issue emergency orders as required.

DPC

1. Request Federal disaster assistance.
2. Implement appropriate "worst case" option.

Appendix A

Executive Order #116, January 7, 2002

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**OFFICIAL COMPILATION OF CODES,
RULES AND REGULATIONS OF THE STATE
OF NEW
YORK**

**TITLE 9. EXECUTIVE DEPARTMENT
SUBTITLE A. GOVERNOR'S OFFICE
CHAPTER I. EXECUTIVE ORDERS
PART 5. EXECUTIVE ORDERS (GEORGE E
PATAKI)**

Text is current through July 31, 2007

Section 5 116 Executive Order No 116 Reconstituting the State Drought Management Task Force

WHEREAS, section 20, subdivision (1)(c) of the Executive Law provides that state and local natural disaster and emergency response functions be coordinated in order to bring the fullest protection and benefit to the people,

WHEREAS, section 21 of the Executive Law created in the executive department a Disaster Preparedness Commission charged with studying all aspects of man-made or natural disaster prevention, response and recovery, preparing State disaster preparedness plans, to be approved by the Governor, and directing State disaster operations and coordinating State disaster operations with local disaster operations following the declaration of a State disaster emergency,

WHEREAS, having determined that there is a need to reconstitute the State Drought Management Task Force in order for it to properly coordinate drought related activities and provide the Governor, State Disaster Preparedness Commission, and State Agency Heads with information needed to judge the degree of emergency and appropriate State response,

NOW, THEREFORE, I, GEORGE E PATAKI, Governor of the State of New York, by virtue of the authority vested in me by the Constitution and Laws of the State of New York, do hereby reconstitute the State Drought Management Task Force as

follows

I Definitions

A "Drought Watch" shall mean the first stage of a developing drought event This stage is declared by the Department of Environmental Conservation (DEC) based on the Drought Forecasting Plan

B "Drought Warning" shall mean the second stage of a impending or imminent severe drought event This stage is also declared by the DEC based on the Drought Forecasting Plan Other State agencies will respond as specified below and as detailed in the Drought Management Coordination Plan

C "Drought Emergency" shall mean the third stage of existing severe and persistent drought conditions This stage is declared by the State Disaster Preparedness Commission (DPC) who shall notify the effected public of actions to be taken

D "Drought Disaster" shall mean the fourth and most severe stage of persistent drought conditions at which a significant proportion of communities in the impacted area are unable to respond adequately In response, an Executive Declaration and Order by the Governor may be necessary to marshal personnel and State resources

E "Drought Forecasting Plan" shall mean a plan to evaluate regional drought conditions using indicators such as precipitation deficits, surface and groundwater levels, reservoir storage and soil moisture conditions

F "Drought Management Coordination Plan" or "the Plan" shall mean a plan to coordinate and implement the State and local response during drought conditions

G "State Agency" shall mean any State de-

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partment, board, bureau, division, commission, committee, public authority, public benefit corporation, council, office or other governmental entity performing a governmental or proprietary function for the State

H "State Agency Head" shall mean the commissioner, chairman, chief executive officer, or highest ranking official for any "State Agency," as defined in subdivision (G) above

I "State Emergency Management Office" or "SEMO" shall mean the disaster and civil defense agency within the Division of Military and Naval Affairs as named in Executive Order No 32, promulgated on December 29, 1983, as continued by Executive Order No 3, promulgated on January 5, 1995

J "Task Force" shall mean the State Drought Management Task Force

II Establishment of the State Drought Management Task Force

There is hereby established, under the jurisdiction of the DPC, a State Drought Management Task Force consisting of five voting members. The five voting members shall include the director of SEMO, who shall serve as the chairperson of the Task Force, and the commissioners of Environmental Conservation, Health, and Agriculture and Markets, and the chairperson of the State Thruway Authority. A Task Force member may designate a representative to attend meetings, in his or her place, and to act on his or her behalf. The members of the Task Force shall receive no additional compensation for services rendered pursuant to this Order. The mission of the Task Force is to provide the DPC with information needed to judge the degree of emergency and appropriate response.

III Responsibilities of the State Drought Management Task Force

The State Drought Management Task Force shall have the following duties and responsibilities:

A to approve the State Drought Management Coordination Plan and periodically recommend and approve updates to such Plan,

B to coordinate drought related activities in accordance with the Plan,

C to recommend declarations of drought emergency to the DPC,

D to meet as needed to ensure adequate State response to drought conditions,

E to develop drought contingency plans in cooperation with local, State and Federal agencies,

F to develop and maintain a list of available resources for meeting drought needs, including an inventory of available Federal programs, and

G to recommend needs for legislation, funds or other actions to improve State drought-response capabilities.

IV Responsibilities of Individual Task Force Members

Individual Task Force members shall participate in DPC drought-response activities and have specific areas of responsibility including, but not limited to, the following:

A State Emergency Management Office

i) to prepare the State Drought Management Coordination Plan,

ii) to chair the Task Force and schedule meetings as needed, including at least one meeting a month during drought warning conditions and at least two meetings a month during a drought emergency,

iii) to, as directed by the Task Force, coordinate drought related activities with appropriate local, State and Federal agencies,

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iv) to prepare drought updates and generally disseminate drought-related information,

v) to advise and respond to drought-affected communities and coordinate implementation of recommended water-use restrictions, and

vi) to maintain and make available stockpiles of pipe, pumps and other water transport and treatment equipment for use during emergency situations

B Department of Environmental Conservation

i) to prepare a State Drought Forecasting Plan,

ii) to monitor and evaluate technical data regarding meteorological and hydrological conditions from available sources on a regular basis,

iii) to determine the current drought status for each region of the State,

iv) to declare drought watches and drought warnings on a statewide or regional basis,

v) to advise the Task Force during drought conditions and provide technical support,

vi) to coordinate State Drought declarations with interstate commissions, and

vii) to ensure the protection of aquatic habitats during drought events

C Department of Health

i) to review and approve requests for use of equipment from the SEMO stockpile,

ii) to monitor surface water and groundwater supply storage levels once a month,

iii) to intensify monitoring of drinking water supplies during drought events,

iv) to timely report water supply levels to the DEC for incorporation into the calculation of drought indices,

v) to obtain and review drought emergency plans from community water systems within drought affected areas and ensure that community water systems act in accordance with such plans

D Department of Agriculture and Markets

i) to ensure that agriculture receives appropriate access to non-potable water supplies during drought events,

ii) to coordinate and consult with Soil and Water Conservation Districts in assessing local groundwater conditions,

iii) to assist in coordinating crop failure data compiled by county cooperative extensions,

iv) to timely provide DEC and the Task Force with agricultural drought information

E Thruway Authority

i) to report to the Task Force regarding the availability of canals and reservoirs to provide water to drought-affected regions of the State, and

ii) to coordinate with SEMO on the availability of Thruway equipment for pumping and transporting water

V Assistance From Other Agencies

The Task Force may seek and shall receive from any other state agency any assistance necessary for the fulfillment of its responsibilities under this Order. Such assistance may include, but is not limited to, technical assistance, information, personnel, and equipment. All State agency recommendations for the declaration of a drought emergency shall be coordinated through the Task Force. The Task Force

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may seek advice and/or assistance from Federal and local agencies, such as the U S Geological Survey, or municipal agencies

VI Voting

Only after a unanimous, affirmative vote of the Task Force, may a recommendation for the declaration of a drought emergency be made by the Task Force to the DPC

Signed George E Pataki
Dated January 7, 2002

Historical Note

Order dated Jan 7, 2002, filed Jan 7, 2002

<General Materials (GM) - References, Annotations, or Tables>

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Appendix B

NYS DROUGHT FORECASTING PLAN

NEW YORK STATE DROUGHT MANAGEMENT TASK FORCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FOREWORD

What is drought? Drought is a prolonged period of dryness. It is not a sudden, extreme event like a flood. Droughts progress through stages and, because of precipitation extremes, their intensities may vary considerably during the drought period. Its periods are not a fixed time but can last months or years. Time of occurrence and duration can cause significant variations in drought impacts. For example, drought in fall and winter months has little direct impact on crop production. For public water supplies, drought is more serious during spring when reservoirs refill and groundwater recharges. Because of the potential to disrupt industrial, commercial, recreational and biological activities, and to negatively affect the economy and the environment, assessing drought conditions is important to residents of New York State and to local and State government officials. For many years, the New York State Department of Environmental Conservation (DEC) has been involved in the monitoring and evaluation of drought conditions.

To improve State drought response activities and assistance to localities, a State Drought Management Task Force (Task Force) was first established in 1980. In 2002, the Task Force was reconstituted under the jurisdiction of the Disaster Preparedness Commission (DPC). The mission of the Task Force is to provide the Governor, the DPC, and State Agencies with information needed to judge the degree of emergency and appropriate State response. The Task Force is chaired by the New York State Office of Emergency Management and includes the Departments of Environmental Conservation, Health, Agriculture and Markets, New York State Canal Corporation and the Thruway Authority. Among other things, the Task Force directed the DEC to prepare a Drought Forecasting Plan.

In addition to preparing a State Drought Forecasting Plan, the DEC also: 1) regularly monitors and evaluates technical data regarding meteorological and hydrological conditions, 2) determines current drought status for each drought management region of the State, 3) declares drought watches and drought warnings on a statewide or regional basis, 4) advises and provides technical support to the Task Force during drought conditions, 5) coordinates State drought declarations with interstate commissions (Delaware River Basin Commission and Susquehanna River Basin Commission), and 6) ensures the protection of habitats during drought events.

The DEC gratefully acknowledges the effort and dedication of the many individuals that have assisted in the preparation of this Drought Forecasting Plan. In particular, Dr. D. Muralidhar, a Research Scientist in the DEC Division of Water and staff of the USGS New York Water Science Center, deserve special recognition.

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1. INTRODUCTION

New York is a water-rich State with an average annual precipitation that ranges from 28 inches in the Lake Champlain Valley to 60 inches in the Catskill Mountains. Even with this relative abundance of precipitation, occasional drought is a normal occurrence. Although New York has not experienced a drought condition equal to the record-breaking events in southeastern New York during the 1960's, several significant events have occurred since that time, particularly in the early and mid-1980s.

The Drought Forecasting Plan (DFP) is a plan for the New York State Department of Environmental Conservation (DEC) to evaluate regional drought conditions based upon indicators such as precipitation deficits, surface and groundwater levels, reservoir storage, and soil moisture conditions. The DFP describes methodologies for monitoring drought indicators. It is based on a staged approach to drought evaluation, declaration, and response actions and activities. In addition to normal conditions, four drought stages are described: watch, warning, emergency, and disaster.

Because the DFP assesses only general trends over relatively large regions of the State, it is important to remind local officials that they must individually continue to monitor and evaluate local conditions and implement appropriate local responses when needed.

2. DROUGHT MANAGEMENT REGIONS

The State is divided into drought management regions as shown in Figure 1. Changes from prior delineations are: a) the subdivision of Region II to separate the area served by the New York City water supply system, b) the addition of Otsego County to Region III to consolidate the Susquehanna River basin counties, and c) the addition of Oneida County to Region IV because of its hydrological similarity to the rest of that Region. Table 1 lists the counties in each drought management region.

The drought management regions are delineated to: a) reflect relatively consistent drought factors, b) provide sensitive and accurate evaluation of conditions around the State's population centers, and c) represent reliable and sufficient data collection points for the calculation of drought indices. While further subdivision could result in more uniformity within a region, the lack of data collection points and additional assessment and reporting requirements, make doing so impractical.

Figure 1. Drought Management Regions

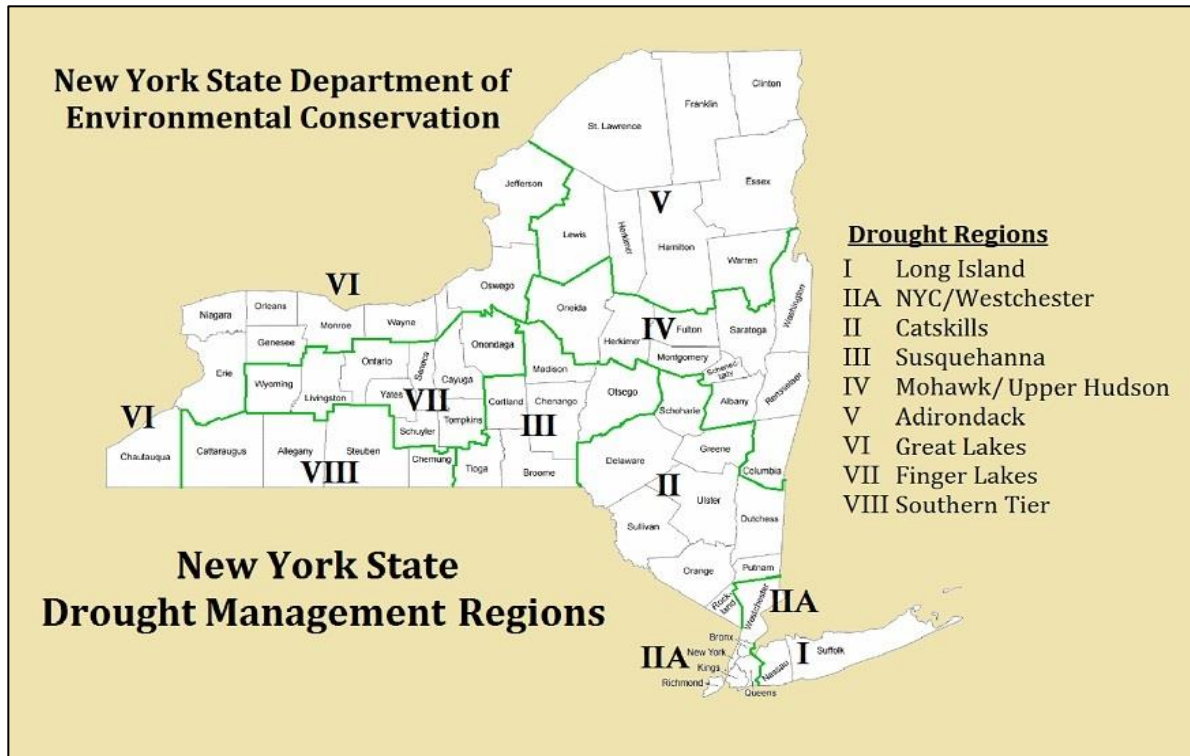


Table 1. Drought Management Region Counties

Region	Counties
I - Long Island	Nassau, Suffolk
IIA - NYC/ Westchester	New York City and Westchester. Additional upstate communities that draw water from the New York City water supply system are also subject to its Drought Management Plan and Rules. (See Appendices D and E)
II - Catskills	Delaware, Dutchess, Greene, Orange, Putnam, Rockland, Schoharie, Sullivan, Ulster
III - Susquehanna	Broome, Chenango, Cortland, Madison, Otsego, Tioga
IV - Mohawk/ Upper Hudson	Albany, Columbia, Fulton, Herkimer (south), Montgomery, Oneida, Rensselaer, Saratoga, Schenectady, Washington
V - Adirondack	Clinton, Essex, Franklin, Hamilton, Herkimer (north), Lewis, St. Lawrence, Warren
VI - Great Lakes	Chautauqua, Erie, Genesee, Jefferson, Monroe, Niagara, Cayuga (north), Orleans, Oswego, Wayne
VII - Finger Lakes	Livingston, Onondaga, Ontario, Schuyler, Seneca, Cayuga (south), Tompkins, Wyoming, Yates
VIII - Southern Tier	Allegany, Cattaraugus, Chemung, Steuben

3. DROUGHT STAGES

To help ensure consistent use of terminology among various agencies, the DEC and the New York State Drought Management Task Force (DMTF) subscribe to the following drought stage terms:

Normal

Drought Watch

Drought Warning

Drought Emergency

Drought Disaster

Drought Watch is the first stage. This stage is declared by DEC based on this plan. It is intended to give advanced notice of a developing drought. At this stage, the general public is urged to conserve water. Public water purveyors and industries are urged to update and begin to implement individual drought contingency plans.

Drought Warning is the second stage. This stage also is declared by DEC based on this plan. It is a notice of impending and imminent severe drought conditions. A warning declaration includes stepping up public awareness and increasing voluntary conservation. Public water supply purveyors and industries are urged to continue to implement local drought contingency plans. Federal, State, and local water resources agencies are notified to prepare for emergency response measures.

Drought Emergency is the third stage. This stage is declared by the New York State Disaster Preparedness Commission (DPC), based on this plan and upon recommendation of the Task Force. It is a notice of existing severe and persistent drought conditions. An emergency declaration is a notice for local water resources agencies to mandate conservation and implement other emergency response measures. A continuing and worsening drought emergency may result in the Governor declaring a drought disaster. It is a notice of the most severe and persistent drought conditions. At this stage a significant proportion of communities in the impacted area likely are unable to respond adequately.

Drought Disaster is the fourth stage. This stage is declared by the Governor when a significant proportion of communities in the impacted area are unable to address local needs adequately. It is the most severe stage of persistent drought conditions. In response, an Executive Declaration and Order by the Governor may be necessary to marshal State personnel and resources.

It is not always necessary to issue drought declarations in the above consecutive order of severity. When a drought stage is emerging, or ending, it may be appropriate, based on rapidly changing conditions, to skip over one or more drought stages. For example, it may be appropriate to relax a drought emergency to drought watch level. Generally, it is better not to lift conservation measures until all of the water resources in an area have recovered to normal levels. It should remain clear that localities and State agencies may and should, as local conditions warrant, implement rules or operations independent of DEC drought watch or warning declarations.

4. DROUGHT STAGE DETERMINATION

The most commonly used indicator of impending drought is the Palmer Drought Index (PDI). It was developed in 1965 by the National Oceanic and Atmospheric Administration principally for agricultural purposes. Because the PDI largely is based on soil conditions, it typically is one of the first indications of moisture deficiency. PDI values typically are between +5 to -5, with positive values indicating wetter soil conditions and negative values indicating drier soil conditions. The National Climate Center now determines the PDI on a weekly and monthly basis for the entire country during the growing season (April through October). They divide New York into 10 climate zones. The PDI may be viewed here,

<https://www.drought.gov/drought/data-maps-tools/current-conditions>

In addition to the PDI, the DEC has established a State Drought Index (SDI) to evaluate drought conditions on a more comprehensive basis by determining whether several drought indicators reach critical thresholds. The drought indicators are precipitation data, reservoir and lake storage level, stream flow and groundwater level. Each of these indicators is compared against critical threshold values to indicate a normal or drought condition. The indicators are weighted on a regional basis to reflect the unique circumstances of each drought management region. Table 2 shows the SDI range of values for each drought stage. Table 3 shows the regional weighting of each drought indicator. Table 4 shows an example of a compiled SDI.

Table 2. State Drought Index

Drought Stage	Drought Index Range*
Normal	100 - 150
Watch	75 - 100
Warning	50 - 75
Emergency	0 - 50

* The value of the State Drought Index equals the sum of the weighted indicator values.

Table 3. Drought Indicator Regional Weighting Values

Regions	Stage	Indicator Values			
		Precipitation	Reservoir / Lake Storage	Stream Flow	Groundwater Levels
I	Normal	20 - 30	10 - 15	10 - 15	60 - 90
	Watch	15 - 20	7.5 - 10	7.5 - 10	45 - 60
	Warning	10 - 15	5 - 7.5	5 - 7.5	30 - 45
	Emergency	0 - 10	0 - 5	0 - 5	0 - 30
II and IV	Normal	30 - 45	20 - 30	20 - 30	30 - 45
	Watch	22.5 - 30	15 - 20	15 - 20	22.5 - 30
	Warning	15 - 22.5	10 - 15	10 - 15	15 - 22.5
	Emergency	0 - 15	0 - 10	0 - 10	0 - 15
IIA	Determined by the New York City Department of Environmental Protection using their reservoir refill probability curves				
III and VIII	Normal	30 - 45	10 - 15	20 - 30	40 - 60
	Watch	22.5 - 30	7.5 - 10	15 - 20	30 - 40
	Warning	15 - 22.5	5 - 7.5	10 - 15	20 - 30
	Emergency	0 - 15	0 - 5	0 - 10	0 - 20
V, VI and VII	Normal	30 - 45	40 - 60	20 - 30	10 - 15
	Watch	22.5 - 30	30 - 40	15 - 20	7.5 - 10
	Warning	15 - 22.5	20 - 30	10 - 15	5 - 7.5
	Emergency	0 - 15	0 - 20	0 - 10	0 - 5

Table 4. Example of Compiled State Drought Index

Drought Region	Palmer Drought Index	Weighted Indicator Values				State Drought Index
		Precipitation	Stream Flow	Ground Water Level	Reservoir / Lake Storage	
I. Long Island	-0.09 Normal	23 Normal	15 Normal	83 Normal	13 Normal	134 Normal
II. Catskills	1.46 Normal	30 Normal	24 Normal	28 Watch	25 Normal	107 Normal
III. Susquehanna	2.42 Normal	31 Normal	20 Watch	37 Watch	15 Normal	103 Normal
IV. Mohawk / Upper Hudson	0.14 Normal	34 Normal	14 Warning	41 Normal	25 Normal	114 Normal
V. Adirondack	-1.06 Watch	33 Normal	3 Emergency	7 Warning	40 Normal	83 Watch
VI. Great Lakes	-1.61 Watch	27 Watch	8 Emergency	12 Normal	40 Normal	87 Watch
VII. Finger Lakes	-0.60 Normal	32 Normal	23 Normal	4 Emergency	35 Normal	94 Watch
VIII. Southern Tier	-1.83 Watch	31 Normal	30 Normal	50 Normal	13 Normal	124 Normal

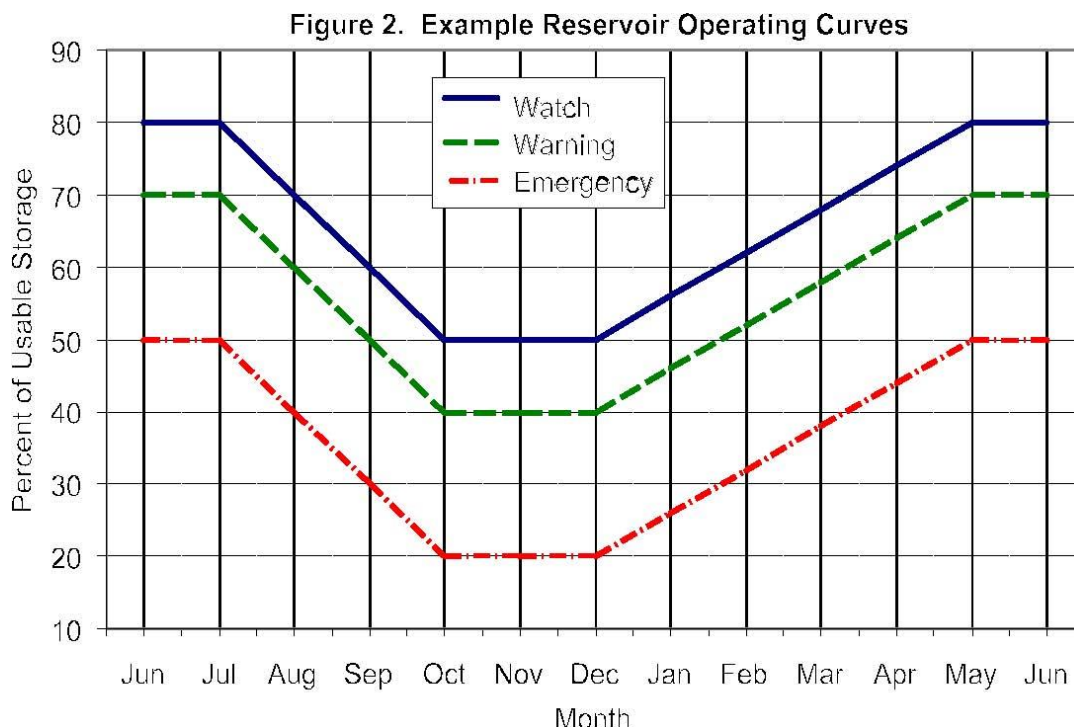
A. Precipitation

To determine precipitation scores, the DEC first gathers precipitation data and statistically compares it to historical records. Departures from historic averages are determined for each drought management area over varying lengths of time, spanning the past 3 to 12 months depending on individual circumstances. Over a 3-month period, in general, a percentage range of over 75 percent to less than 45 percent covers the range of normal through drought emergency, respectively. Whereas, over a 12-month period the percentages range from more than 85 percent to less than 55 percent, reflecting the lesser variance over longer time periods. The DEC then assigns a precipitation score after considering these short versus long term results, weather forecast trends and patterns, and seasonal significance.

The DEC gathers precipitation and weather forecast information from the National Weather Service. The precipitation reporting network for New York State consists of over 200 sites and provides an adequate metric to monitor precipitation conditions across the State. The Northeast Regional Climatic Center at Cornell University generates a product that aggregates all available precipitation gages in New York State.

B. Lake / Reservoir Storage

To determine lake / reservoir storage level scores, the DEC uses data from the New York State Department of Health (DOH). Ideally, current usable storage should be compared to historic or normal storage, taking into account the normal seasonal pattern of reservoir fluctuation. For instance, storage declines during summer because of low inflow and high demand and recovers during winter and spring when inflow is higher and demand is less. This pattern is reflected in the example reservoir operating curves depicted in Figure 2.



Reservoir storage is considered a leading indicator of impending or actual drought for water supply systems relying on surface storage. Analyses of current storage and the balance of inflows and outflows can lead to significant conclusions on drought status. The DEC gathers water supply and other reservoir storage conditions on a regular basis from all available sources, including the New York City Department of Environmental Protection. During drought conditions, the DOH also monitors specific water supply storage levels and provides this information to the DEC on a monthly basis. A map and list of these water supply reservoirs is found in Figure 3 and Table 5.

Figure 3. Reservoir Watch List Map

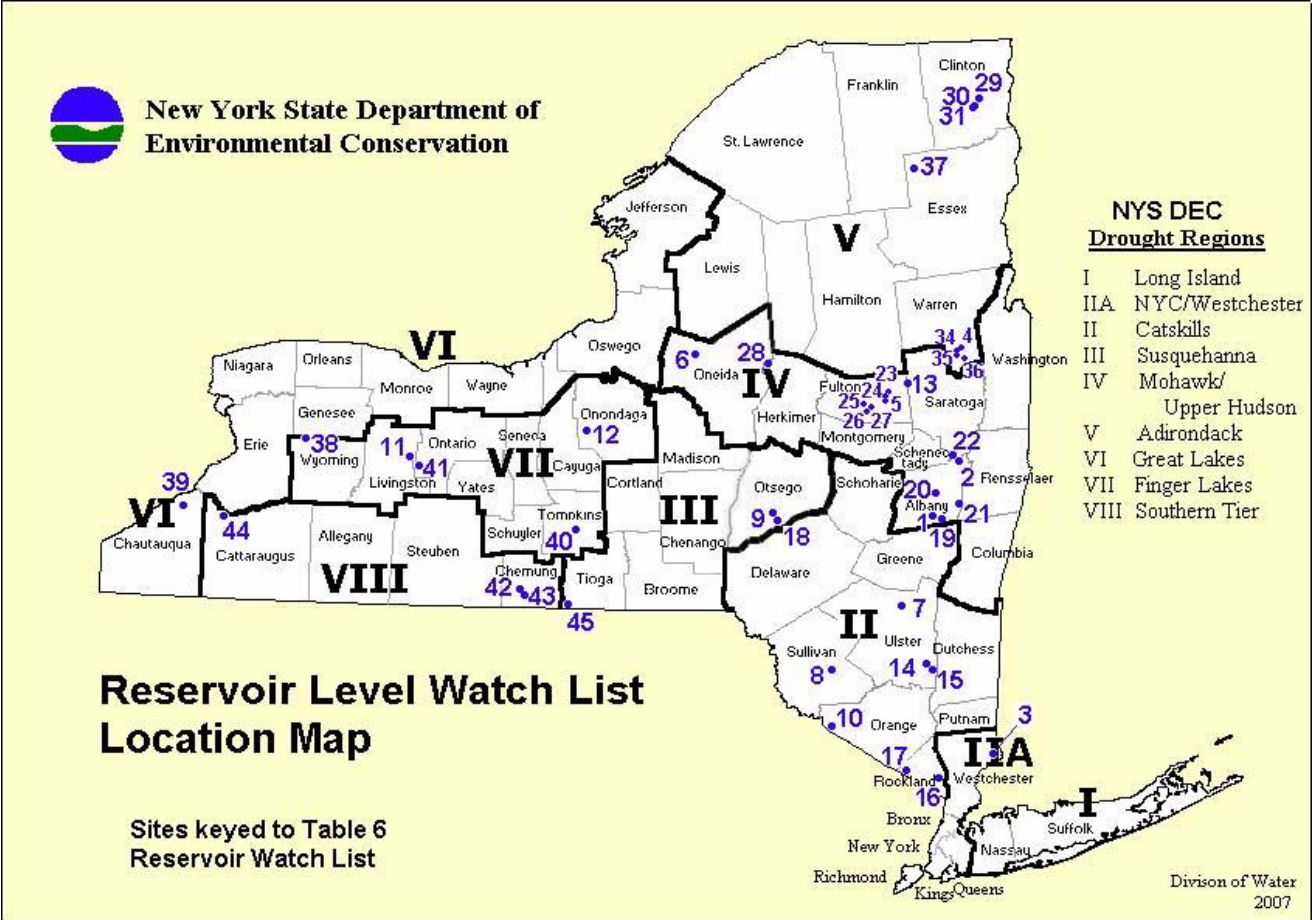


Table 5. Reservoir Watch List

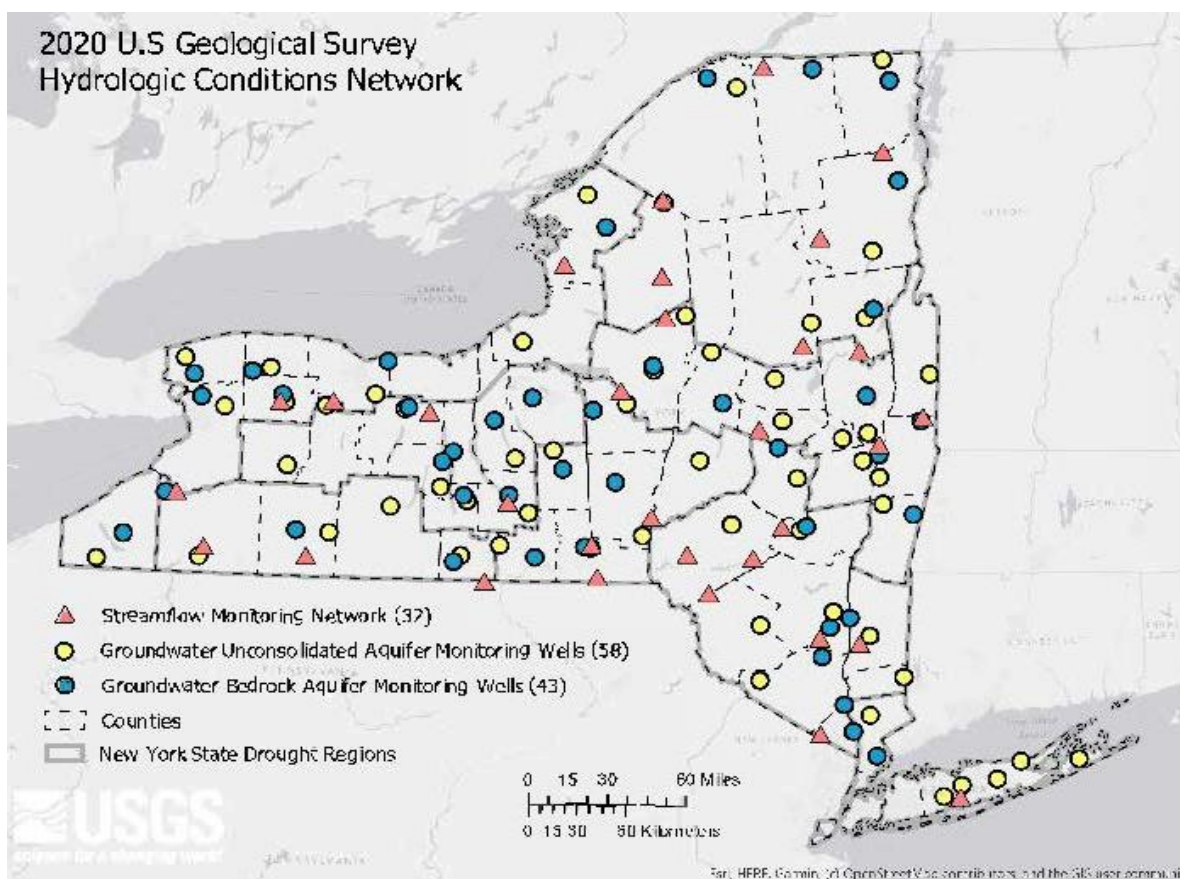
Drought Region	System Name	County	Source(s)	Map ID #
II	Highland	Ulster	Upland Reservoirs 1,2, and 5	14
			Hudson River	15
II	Kingston (C)	Ulster	Cooper Lake	7
II	Monticello	Sullivan	Kiamesha Lake and wells	8
II	Port Jervis	Orange	Reservoirs 1,2, and 3	10
II	United Water of NY	Rockland	Lake Deforest	16
			Ramapo Well Fields	17
III	Oneida (C)	Oneida (serving Madison)	Glenmore Reservoirs	6
III	Oneonta (C)	Otsego	Upper Reservoir (Wilber L)	9
			Lower Reservoir, wells	18
IV	Albany (C)	Albany	Basic Creek Reservoir	1
			Alcove Reservoir	19
IV	Bethlehem	Albany	Vly Creek Reservoir	20
			Hudson River infiltration	21
IV	Latham Water District	Albany	Stony Creek Reservoir	22
			Mohawk River, wells	2
IV	Gloversville	Fulton	Rice Reservoir	27
			Jackson Summit Reservoir	24
			Cameron Reservoir	23
			Port Reservoir	26
			Dixon Reservoir	5
			Lake Edward	25
IV	Mohawk Valley Water Board (Utica)	Oneida	Hinckley Reservoir	28
V	Plattsburgh (C)	Clinton	Mead Reservoir	29
			West Brook Reservoir #1	30
			West Brook Reservoir #2	31
V	Glens Falls	Warren	Keenan Reservoir	35
			Wilkie Reservoir	34
			Butler Pond	4
			Halfway Brook	36
V	Saranac Lake	Essex (serving Franklin)	McKenzie Pond	37
VI	Fredonia	Chautauqua	Canadaway Creek Reservoir	39
VII	Akron	Wyoming (serving Erie)	Akron Reservoir	38
VII	Ithaca	Tompkins	Sixmile Creek Reservoir	40
VII	Onondaga Water Authority	Ononodaga	Otisco Lake	12
VII	Rochester (C)	Livingston	Hemlock Lake	11
		Ontario (serving Monroe)	Canadice Lake	41
VII	Syracuse (C)	Onondaga	Skaneateles Lake	12
VIII	Elmira	Chemung	Hoffman Reservoir	42
VIII	Gowanda	Cattaraugus	Chemung River, wells	43

			Point Peter Reservoir, wells	44
VIII	Waverly	Tioga	Dry Brook Reservoir, wells	45

C. Stream Flow

To determine stream flow scores, using statistics provided by the U.S. Geologic Survey (USGS), the DEC compares current stream flow to historic records. Monthly flow duration curves are used to determine the percent of time current flows would be equal to or exceed the historic record. For instance, stream flows that are equaled or exceeded up to 75, 75-90, 90-95 and 95-99 percent of the time generally are considered as normal, drought watch, drought warning and drought emergency conditions, respectively. Figure 4 shows the distribution of both stream and groundwater monitoring points the DEC uses to assess and monitor drought conditions.

Figure 4. Stream and Groundwater



Stream and Groundwater Monitoring Network

In cooperation with DEC and other Federal, State and local agencies, the USGS operates a large number of stream monitoring stations. To assess and monitor drought conditions, the DEC uses those stations with long enough records to be statistically useful and uninfluenced by upstream impoundment structures. Although longer periods are desirable, the DEC uses monitoring stations with at least 5 years of continuous monitoring records. Detailed hydrological data is found on the USGS website, <http://ny.water.usgs.gov/projects/duration>.

D. Groundwater Level

To determine the groundwater level scores, with assistance of the USGS, the DEC compares current well level data to historical maximum, minimum and average conditions. Similar to stream level scoring, groundwater levels that are equaled or exceeded up to 75, 75-90, 90-95 and 95-99 percent of the time generally are considered as normal, drought watch, drought warning and drought emergency conditions, respectively.

The well sites shown in Figure 4 are located to monitor both upland and valley floor aquifers. Upland aquifers recharge only with precipitation, are more subject to seasonal variation, and are usually the first to show signs of reduced levels. Whereas, valley floor wells have a longer response time, and due in part to recharge from upland aquifers, are not as likely to show very low levels.

The Long Island aquifer is a unique situation, with a vast amount of unconsolidated glacial deposits. Even though long term records show slight variation in groundwater levels, wells close to the coast and where pumping rates are high are susceptible to salt contamination. Accordingly well observations in these areas are most critical.

5. DROUGHT FORECASTING / PLAN UPDATES

Under normal conditions, the data from indicator stations will be assessed on a monthly basis and no special reports will be prepared on drought conditions. If a drought develops, the DEC will increase the frequency of drought assessment and prepare reports, as necessary.

The Task Force will convene monthly, or as required by the State Office of Emergency Management, following a declaration of a drought warning by the DEC in any area of the State. The Task Force will provide information regarding drought conditions to the Governor and the DPC.

6. CONCLUSIONS / RECOMMENDATIONS

There is a continuing need for DEC, the New York City Department of Environmental Protection, and the Susquehanna and Delaware River Basin Commissions to coordinate drought condition declarations.

It should be made clear that localities and State agencies may implement rules or operations independent of DEC drought forecast determinations.

There is a continued need for cooperation among the various data providers to ensure timely collection of data, drought evaluation and forecasting.

Despite recent improvements in the scope of the hydrologic conditions monitoring network, establishing satellite telemetry throughout the network will make monitoring and evaluation of drought conditions more effective.

With particular regard to evaluating the impacts of climate change, it is especially important to maintain long-term data recording.

Every public water supplier that relies on surface storage should develop reservoir/lake stage storage operational rule curves for their systems. In turn, a routine system for reporting data to the New York State Department of Health also should be developed, commensurate with drought severity.

To improve understanding of stream flow in relation to drought conditions, flow duration curves should continue to be developed.

Appendix C

State OEM Emergency Equipment Stockpile Drought-Related Emergency Equipment and Resources

State OEM Emergency Equipment Stockpile Drought-Related Emergency Equipment and Resources

State OEM maintains an emergency equipment stockpile made available to local governments and State agencies on a temporary loan basis. The equipment is primarily for:

- Emergency power generation
- Flooding
- Drought relief.

Loan Procedures

- All emergency equipment loans are coordinated by local emergency managers.
- All users must complete and submit a Stockpile Loan Agreement.
- Equipment is loaned for a 30-day period. If a loan extension is needed, a written request along with a description of what is being done to correct the situation must be submitted to the Director of State OEM. The maximum loan period is 90-days.
- Transportation of stockpile equipment is the user's responsibility.
- Return of equipment must be coordinated with the stockpile manager.

Inventory

Power Generation

State OEM has 1.6kw to 800kw power generators available. Generators in the 10 and 15kw are single phase, and to 50kw thru 800 kw range have both single-and three-phase capability. Power sources for the generators are gasoline, and diesel engines. Generators are mounted on hand carts, and trailers.

Pumps

Pumps are available from 2" to 6" sizes, with 180 gpm to 2200 gallons per minute (gpm) capacity. Pumps are operated from gas, or diesel power. Most pumps are trailer mounted, although several are skid mounts.

Water Tankers

State OEM has 5,500 to 6,700-gallon (semi-trailers) and 500-gallon (pintle towed) water tankers. When using water tanks for potable water, the Department of Health (DOH) must approve the water source prior to State OEM issuing the equipment. Equipment **WILL NOT** be issued without DOH approval.

Diatomaceous Earth (DE) Water Filters

State OEM has 350 gpm diatomaceous earth (DE) filters available for issue. These filters are used to process surface water for human consumption. DOH must approve the water source prior to State OEM issuing this equipment.

Appendix D

New York City Drought Management and Contingency Plan

New York City Drought Management and Contingency Plan

October 1, 2012

The New York City Drought Management and Contingency Plan is available to provide local governments, agencies, and water suppliers in Drought Sub-Region IIA with information needed to help them coordinate their water conservation efforts with New York City's requirements. The City's October 2012 drought plan, or subsequent revisions, should be used by Drought Sub-Region IIA public water suppliers to ensure effective water management is implemented consistent with New York City requirements. The plan is owned, operated, and maintained by the New York City, Department of Environmental Protection. This plan is on file with the State OEM Planning Section.

Appendix E

Drought Sub-Region IIA

Public Water Systems on New York City Supply

PWS ID	WATER SYSTEM	SOURCE STATUS *	SOURCE
ORANGE COUNTY			
NY3503526	Cornwall-on-Hudson	Direct	Catskill Aqueduct
NY3503615	Firthcliffe Water District	CC	Catskill Aqueduct
NY3517624	Mt. Saint Joseph Convent	Emergency	Catskill Aqueduct
NY3503580	New Windsor Consolidated Water District	Direct	Catskill Aqueduct
NY3503549	Newburgh (City)	Emergency	Catskill Aqueduct
NY3503578	Newburgh Consolidated Water District	Direct	Delaware Aqueduct
NY3522323	NY Air National Guard	CC	Catskill Aqueduct
NY3511885	Stewart Field Water District	Direct	Catskill Aqueduct
PUTNAM COUNTY			
NY3905680	Brewster Heights Water District	Direct	Croton Reservoirs
NY3903642	Carmel Water District #2	Direct	Croton Reservoirs
NY3903652	Cold Spring (Village)	Emergency	Catskill Aqueduct
NY3903655	Continental Village Water District	Direct	Catskill Aqueduct
NY3905710	Graymoor (Village)	Emergency	Catskill Aqueduct
NY3912233	Lake Peekskill Water District	Direct	Catskill Aqueduct
ULSTER COUNTY			
NY5530001	Ashokan Headworks	Direct	Ashokan Reservoir
NY55xxxxx	High Falls WD	Direct	Catskill Aqueduct
NY5503377	Marlborough Water District	Direct / CC	Delaware Aqueduct
NY5515690	New Paltz (Town) Water District	CC	Catskill Aqueduct
NY5503379	New Paltz (Village)	Direct	Catskill Aqueduct
NY5510590	Walkill Correctional Facility	Emergency	Catskill Aqueduct
WESTCHESTER COUNTY			
NY5903458	Amawalk Heights Water District	CC	Catskill Aqueduct
NY5917105	Apple Hill Farm Water District	CC	Catskill Aqueduct
NY5903456	Aquarion Water Company of NY	CC	Delaware Aqueduct/Rye Lake
NY5903438	Bear Ridge Lake Water District	CC	Catskill Aqueduct
NY5903420	Briarcliff Manor (Village)	Direct	New Croton Aqueduct
NY5903422	Buchanan (Village)	CC	Catskill Aqueduct
NY5903478	Cedar Downs Water District	CC	Catskill Aqueduct
NY5903423	Cortlandt Consolidated Water District	CC	Catskill Aqueduct
NY5903425	Croton-on-Hudson	Emergency	Catskill Aqueduct
NY5903427	Elmsford (Village)	Direct	Catskill Aqueduct
NY5903429	Greenburgh Consolidated Water District #1	Direct	Delaware Aqueduct
NY5903430	Harrison Water District #1	Direct	Kensico/Rye Lake
NY5903430	Harrison Water District #4	Emergency	Delaware Aqueduct/Rye Lake

NY5903471	Hawthorne Improvement District	Direct	Catskill Aqueduct
NY5903432	Irvington Water Supply	Direct	New Croton Aqueduct
NY5903433	Larchmont (Village)	CC	Delaware Aqueduct/Rye Lake
NY5903439	Meadowbrook Water District	CC	Catskill Aqueduct
NY5903436	Montrose Improvement District	CC	Catskill Aqueduct
NY5903441	Mt. Vernon Water Department	Direct / CC	Catskill Aqueduct
NY5903442	New Castle - Stanwood Water District	Direct	Catskill/New Croton Aqueducts
NY5903445	North Castle Water District #1	CC / Emergency	Delaware Aqueduct
NY5903492	North Castle Water District #5	Emergency	Catskill Aqueduct
NY5930056	Northern Westchester Joint Water Works	Direct	Catskill Aqueduct
NY5903485	Old Farm Hill Water District	CC	Catskill Aqueduct
NY5903451	Ossining Water Department	Direct	New Croton Aqueduct
NY5903452	Peekskill (City)	Emergency	Catskill Aqueduct
NY5911901	Pelham (Village)	CC	Catskill/New Croton Aqueducts
NY5920776	Pleasant Ridge Water District	CC	Catskill Aqueduct
NY5903455	Pleasantville Water District	CC	Catskill Aqueduct
NY5903457	Scarsdale Water Department	CC	Delaware Aqueduct
NY5903450	Sleepy Hollow (Village)	Direct	Catskill/New Croton Aqueducts
NY5903461	Tarrytown Water Supply	Direct	Catskill/New Croton Aqueducts
NY5903462	Thornwood Water District	Direct	Catskill Aqueduct
NY5903444	United Water of New Rochelle	Direct	Catskill/New Croton Aqueduct
NY5903440	Valhalla Water District (Mt. Pleasant)	Direct	Catskill Aqueduct
NY5903488	Westchester County Water District #1	Direct	Delaware/Catskill Aqueducts
NY5903489	Westchester County Water District #2	Direct	Croton Reservoirs
NY5903482	Westchester County Water District #3	Direct	Catskill Aqueduct
NY5903435	Westchester Joint Water Works	Direct	Delaware Aqueduct/Rye Lake
NY5903464	White Plains (City)	CC	Delaware Aqueduct
NY5903465	Yonkers (City)	Direct / CC	Catskill Aqueduct
NY5903467	Yorktown Consolidated Water District #1	Direct	Catskill Aqueduct

* SOURCE STATUS

Direct = Direct Connection to NYC System or Intake from NYC System Reservoir

CC = Receives NYC Water from Consecutive Connection to Direct System

Emergency = NYC Water Used for Emergency Only